

Trends in N₂O and SF₆ mole fraction in archived air samples from Cape Meares, Oregon (USA) 1978–1996; acp-2019-114

The manuscript "Trends in N₂O and SF₆ mole fraction in archived air samples from Cape Meares, Oregon (USA) 1978–1996" describes measurements of nitrous oxide and sulfur hexafluoride obtained from archive air samples collected in the northern hemisphere. Since there are few measurements of atmospheric N₂O and SF₆ in the northern hemisphere from this period, these data will provide a valuable addition to southern hemispheric archive air measurements. The analytical method is sound and the paper is well written.

Minor Comments

Page 1, Line 17: Please consider using mixing ratio or mole fraction instead of concentration, or refer to "mole fraction in dry air" on first use of concentration. Concentration is the amount of substance in a defined space or volume.

Page 3, Line 20: Consider including recent papers that suggest a shorter lifetime for SF₆.

Kovács, T. *et al.* (2017) 'Determination of the atmospheric lifetime and global warming potential of sulfur hexafluoride using a three-dimensional model', *Atmospheric Chemistry and Physics*, 17(2), pp. 883–898. doi: 10.5194/acp-17-883-2017.

Ray, E. A. *et al.* (2017) 'Quantification of the SF₆ lifetime based on mesospheric loss measured in the stratospheric polar vortex', *Journal of Geophysical Research*. doi: 10.1002/2016JD026198.

Page 4, Line 11: Is the air dried or collected wet?

Pg .3, Line 21: Seems like a more recent SF₆ mole fraction could be inserted here. Global mean mixing ratios are available from several sources, such as the AGAGE data repository (<https://agage.mit.edu/data/agage-data>) or State of the Climate reports: State of the Climate in 2017, supplement to the August 2017 issue of the Bulletin of the American Meteorological Society (BAMS Vol. 99, No. 8); (<https://www.ncdc.noaa.gov/bams/2017>).

Page 5. Line 7: According to <https://www.esrl.noaa.gov/gmd/ccl/refgas.html>, the N₂O scale associated with CB11406 (328.71 ppb) is NOAA-2006A (a 2011 update from NOAA-2006)

Page 5, Line 13: Not sure what is meant by "sets of 6 gas analysis". Maybe just say "repeated analysis of a reference standard"?

Page 6, line 11: Does the error stated here include the uncertainty on the SF₆ mole fraction in the dilution gas and SF₆ that might be present in the 1 ppm N₂O aliquot? 0.001 ppt seems too small, unless you have some other way to verify SF₆ in the dilution gas to better than 0.001 ppt.

Page 6, Line 15: Shouldn't the slope, 0.870, be the inverse of the coefficient a₁ (1.146)? These don't quite match.

Page 10, Line 7: check spelling of "Leuker" vs "Lueker" et al. (2003)

Page 10, Line 23: Is it known that SF6 sources are a-seasonal? Please provide a reference.